REMARKS

The official action of 16 October 2009 has been carefully considered and reconsideration of the application as amended is respectfully requested.

Claim 26 has been amended in accordance with the description in the specification as filed at, for example, Figs. 6 and 7 and the text relating thereto (see, e.g., page 5, lines 1-7 and page 9, lines 1-3), which shows that, without the (high) pressure applied due to the vacuum bag and autoclave, each of the first and second subcomponents and tooling expand with their own individual expansion coefficients (e.g., page 5, lines 1-3) whereas, with the pressure applied due to the vacuum bag and autoclave, each of the first subcomponent, second subcomponent and tooling expands with a common expansion coefficient (e.g., page 5, lines 5-7).

Claim 32 has been canceled to remove the basis for the objection on page 2 of the official action.

The claims stand rejected under 35 USC 103(a) as allegedly being unpatentable over Cerezo Pancorbo et al in view of one or more of Artz et al, Younie et al, Wilden et al, and Kline et al. The claims also stand rejected under 35 USC 103(a) as allegedly being unpatentable over Breur et al in view of one or more of Artz, Younie et al, and Kline et al. Applicants respectfully traverse these rejections.

The claimed invention is based at least in part upon Applicants' discovery that, by use of the expansion compensating tooling recited in claim 26, expansion of the second subcomponent of the structure may be controlled such that there is not a differential expansion of the first and second subcomponents and such that no out-of-plane deformation occurs due to the differential expansion and contraction of the respective subcomponents. In particular, Applicants discovered that this result can be achieved by (a) providing the surface of the recited tool in contact with the second subcomponent with enhanced roughness **in combination with pressure**, applied by the vacuum bag and autoclave, effective to achieve sufficient friction to get expansion of the tooling and second subcomponent at a common expansion coefficient, and (b) making the common expansion coefficient the same as the expansion coefficient of the first subcomponent so that the dimensions of the respective subcomponents change at the same rate. That the expansion of the second subcomponent and tooling at the desired common expansion coefficient is dependent on the use of such pressure, and not an inherent result of similarities of the individual expansion coefficients of the respective components/tooling and/or surface roughness of the tooling alone, can be seen by a comparison of Figs. 5 and 6.

Claim 26 has now been amended in accordance with these discoveries to provide that (a) the individual expansion coefficients of the second subcomponent and the tooling are such that expansion of the second subcomponent and the tooling at a common expansion coefficient can only be achieved with surface roughness in combination with application of pressure (whereby to preclude a situation in which the second subcomponent

and tooling having a common expansion coefficient solely by virtue of a similarity of their individual expansion coefficients or by virtue of a similarity of individual expansion coefficient combined with surface roughness of the tooling); and (b) the common expansion coefficient is different from the individual expansion coefficient of the second subcomponent but the same as the individual expansion coefficient of the first subcomponent.

The cited references do not show or suggest these claim features, either alone or in proper combination. With respect to (b), none of the references contemplates the use of a tooling to force an already-cured composite component to expand at a common expansion coefficient that is more (or less) than its own individual expansion coefficient in order to promote bonding to another component with an individual expansion coefficient that is the same as the common expansion coefficient and thereby to avoid residual stresses between the components. Moreover, none of the references provides any other reason or motivation to modify either of the cited primary references to arrive at the recited relationship of the respective individual and common expansion coefficients . Indeed, none of the references even recognizes the result effective nature of this relationship whereby Applicants respectfully submit that the references cannot set forth even a *prima facie* case of obviousness for the invention now claimed. See MPEP 2144.05(II)(B) ("A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment

capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result- effective variable.).").

With respect to (a), none of the references contemplates the use of a tooling with a substantially different expansion coefficient than the component with which it contacts such that the tooling and the component would expand with a common expansion coefficient if and only if, in addition to providing the tooling with sufficient surface roughness, the pressure of a vacuum bag and autoclave were applied. To the contrary, in the references upon which the Examiner relies to show the respective expansion coefficients of tooling and component to be manufactured (Artz and Younie), the tooling must have either the same or a similar coefficient to the component such that the tooling and component would be expected to expand with a common expansion coefficient even in the absence of pressure applied by a vacuum bag and autoclave. Indeed, in Artz, the tool and the components must have expansion coefficients that are sufficiently similar to insure that they do not change shape at a different rate (regardless of pressure). (See Artz at paragraph [0006] ("As the tool is heated, it may change shape at a different rate than the composite materials if the coefficients of the tool and composite material are not similar enough.").

This being the case, it cannot be said that a combination of the cited references, even if proper, would arrive at the claimed invention, wherein the respective individual expansion coefficients of the tool and component must be sufficiently different as **to require** a roughening of the tool surface in combination with an application of the pressure of a vacuum bag and autoclave to have the tool and component expand with a common

expansion coefficient. Applicants respectfully emphasize that this claim recitation limits the individual expansion coefficients of the tool and the second subcomponent respectively, i.e., the individual expansion coefficients must be such as to require the application of the claimed pressure of a vacuum bag and autoclave to expand at the same rate (compare Figs. 6 and 7 of the present application). This recitation respectfully cannot be met by components whose common expansion coefficient may be achieved by a similarity of their individual expansion coefficients alone or a result of a similarity of their individual expansion coefficients in connection with surface roughness of the tool and/or high temperature alone. This is true whether or not the components were actually, or were expected to be, subjected to the application of pressure of a vacuum bag and autoclave; the application of such pressure to components with the same or similar coefficients of friction, while sufficient to achieve a common expansion coefficient, would **not** indicate whether or not such pressure is necessary to achieve a common expansion coefficient, as required by the claims.

In view of the above, Applicants respectfully submit that the cited references cannot set forth even a *prima facie* case of obviousness for the invention defined by the claims as amended.

The claims also stand rejected on the ground of alleged nonstatutory obviousness-type double patenting over claims 1, 7 and 14 of US Patent 6,508,090 in view of Artz et al or Younie et al. Applicants respectfully traverse this rejection for the same reasons as discussed above. Specifically, neither the cited patent nor the cited secondary references show or suggest the claim features (a) or (b) discussed.

For the above reasons, Applicants believe that all rejections of record have been overcome and that the application is now in allowable form. An early notice of allowance is earnestly solicited and is believed to be fully warranted.

Please charge Account No.12-0425 for any fees which may be due by this paper.

Respectfully submitted,

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